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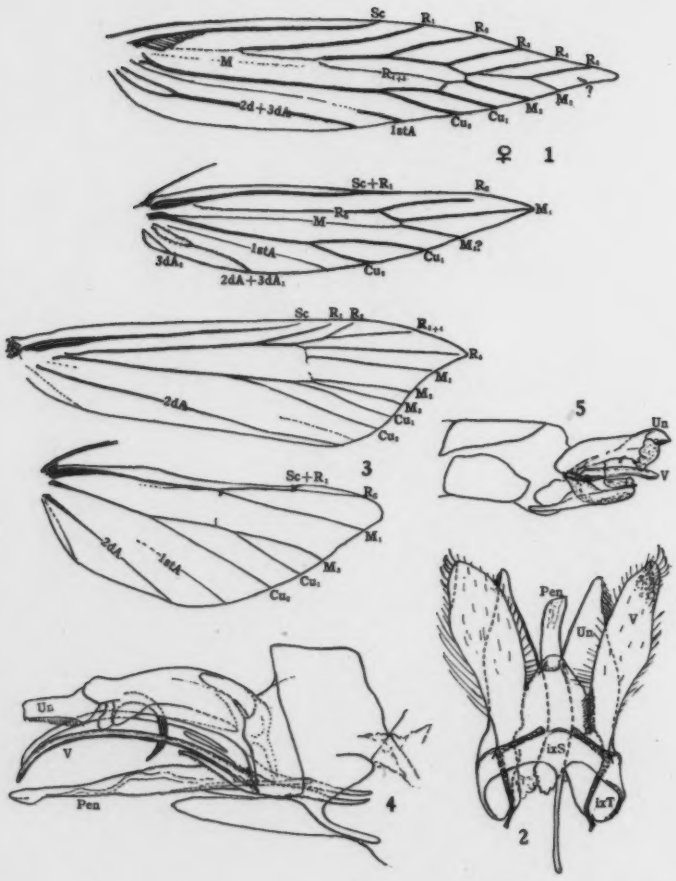

PHAEOSES SABINELLA, 1, 2; OXYELOPHILA CALLISTA, 3; GELECHIA ARENELLA, 4; G. PETASITIS, 5.—FORBES.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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Five Strange Lepidoptera (Oinophilidae, Noctuidae, Gelechiidae).

By WM. T. M. FORBES, Cornell University, Ithaca, New York.

(With Plate V)

The following Lepidoptera are described at this time because I would like to refer to them elsewhere, where there will not be room for a satisfactory description. The first one is thoroughly aberrant, but appears to belong better in the family Oinophilidae, which has not before been reported from the United States, than to the Tineidae, to which it also shows some affinity. The Oinophilidae are a family of somewhat special interest, as they appear to form a connecting link between a whole group of families of the lower Tineoidea, namely, the Tineidae, Lyonetiidae, Opostegidae and Gracilariidae, with the isolated and aberrant genera *Cemiostoma, Bedellia, Bucculatrix, Phyllocnistis,* and their relatives. Of these only the Gracilariidae have been lately revised by Meyrick. In larval habit, however, the known Oinophilidae contrast strongly with the Gracilariidae, Lyonetiidae and Opostegidae, feeding on decaying vegetable matter and fungi, like many Tineidae, while in

appearance and structure the imagos are closely similar to the Lyonetiidae and Opostegidae. They are strongly flattened moths, with flat coxae closely appressed to the body, usually with smooth heads, rising to a rounded ridge between the antennae, but often with a loose tuft on the vertex, as in *Oinophila* itself, and rather small maxillary palpi of the folded type. The labial palpi have a well-set-off, fusiform, terminal joint as in the Tineidae, and are normally without bristles. The venation in the known genera is more or less reduced. Besides the well-known European and tropical genera *Oinophila* and *Opogona*, and the following genus, there are numerous less known tropical forms, gradually grading into the Lyonetiidae and the true Tineidae. As a rule nothing is known of the life histories of these and nothing has been published on several interesting points in their structure, so that it is impossible to say to which family they belong, unless the families be combined.

The present form may be characterized as follows:

PHAEOSES new genus (φαιός brown; σής moth).

Head smooth-scaled, as a rule slightly ruffled on the vertex, but without any definite tufting; eyes small, far apart; ocelli absent; front somewhat retreating, but convex, the rounded ridge between the antennae less prominent than in *Opogona*. Antennae three-fifths as long as fore wing, evidently turned back across the eye in repose; scape a little longer than width of eye, a little broadened, but without eyecap or pecten; shaft with a single whorl of appressed scales on each segment, with a few weak setae passing between their bases. Maxillary palpi small but folded, and stronger than in the Gelechiidae; tongue obsolete; labial palpi with basal joint short, second upturned, smooth and concave on upper surface, fitting the face, but normally drooping in death, lower edge rough-scaled; third segment short-fusiform, two-thirds as long as second, rough-scaled and flattened dorso-ventrally, commonly held porrect; no bristles visible. Body strongly depressed, the abdomen very flat; coxae and especially fore coxae broad and closely pressed to body; fore tibia very short and stout, with strong epiphysis; middle legs normal; hind tibia with spurs at a third its length,

with a fringe of long bristly hairs above; hind tarsus smooth, normal. Metathorax relatively large, as in *Opogona*.

Fore wing (Plate V, figure 1) lanceolate, not caudate, but distinctly curved down at the apex; cell narrow, with a broken dividing vein from base to apex, weakly connected with the front edge of the cell halfway between the origins of *R*1 (11) and *R*2 (10), probably representing part of the base of media and the stem of *R*4+5; *R*1 arising at one-third length of cell, *R*2 just beyond middle, the stem of *R* between them definitely angled at the point of separation of *R*4+5; *R*3 (9) arising shortly before end of cell, well separated from *R*4-*M*2 (5 to 8), which arise from a common stem at end of cell; *R*4 (8) given off before *M*2 (5), and *M*1 (6) practically obsolete, but I think traceable; *R*5 (7) running to costa; free parts of dorsal veins parallel, but *M*3 (4) strongly converging at origin to the stem of *R*4-*M*2; *M*3 and *Cu*1 (3) separated by a moderately long bent vein, which receives the dividing vein of the cell, *Cu*1 and 2 (3 and 2) by a long oblique vein; 1*st A* (1c) free, the outer part well chitinized; 2*ndA* (1b) distinctly forked at base. Hind wing two-thirds as wide, lanceolate, with the costa hardly at all concave at the middle; fringe 2; *Sc* (8) ending at two-thirds, running close to costal edge; *R* (7) moderately separated from *M*1 (6), running obliquely to costa; *M*1 (6) to apex; *M*2 (5) nearly connate with it, continuing the distinct base of *M*; cell open below *M*2; *M*3 (4) lost; *Cu*1 (3) and 2 (2) forming a strongly forked free vein; 1*stA* (1c) well developed; 2*ndA* (1b) short and obscurely forked; 3*rdA* (1a) practically obsolete. Frenulum simple in both sexes; frenulum-hook of male normal, of female made up of a series of hooked hair-scales, apparently without any membranous portion.

Fixed hairs are completely absent, except for the usual patch on the inner margin of the fore wing, even the small area over the base of *R*, which exists in *Opogona* and *Opostega*, being lost, and represented only by a group of weak transverse folds. The female ovipositor is membranous, slender and extensile.

The genus will run by Meyrick's key (Proc. Linn. Soc. N. S. W. 22: 298, 1897) to *Lozostoma* (*Opogona*), from which it differs in many particulars, especially the convex front, and

nearly complete venation. Of more recent genera it shows a certain resemblance to *Hippiochaetes* Meyrick, which has a tufted head, and to *Amathyntis* Meyrick, which obviously differs in the bristled palpi, as well as markedly different venation. In North America the flattened body, smooth head and folded maxillary palpi will immediately distinguish it, save perhaps from a few Cosmopterygidae, which differ in their smooth, regularly tapering third palpal segment, and the sinuate costa of the hind wing. In my family key it will run to the Acrolepiidae, but is easily distinguished by the separate *M*1 and 2 of the hind wing, and completely smooth head. By Hampson's key (Nov. Zool. 25: 387, 393, 1918) it runs to the Lyonetiadae, family No. 84.

There is only the following species (*genotype*):

Phaeoses sabinella, new species.

Shining gray-brown (mouse gray); ridge between antennae, face and under side much paler, dirty white; outer side of fore coxae and femora, fore tibiae and tarsi, part of middle femora, especially toward the base and apex, and on the outer side, and shorter spurs of middle tibiae, brown; middle tibiae and shorter spurs of hind tibiae somewhat shaded with brown. There is little variation in a series of nearly fifty specimens of varying quality, but on account of the brilliant gloss it is impossible to form an accurate judgment of the shades of color, especially on the legs. Expanse 9 mm.

The male genitalia (Plate V, figure 2) are not unlike those of related forms. The part considered to be the *uncus* (*Un*) is a chitinization on each side of the anal opening, continuous with the *tegumen* (*ixT*), which is itself continuous with the *vinculum* (*ixS*). There is no chitinization at all in the mid-dorsal line, and the lateral suture is indicated only by the articulation of the *valve* (*V*). The valves are ankylosed with the *juxta* and cannot be opened beyond the position figured. The valve is provided on its inner face with a mass of basally directed hair near the apex, and a patch of spines near the base, which are indicated on the right side of the figure as visible by transparency.

Sabine River, Louisiana, opposite Orange, Texas, June 20, 1917: *holotype* and numerous paratypes; Biloxi, Mississippi, June 13, 1917, paratypes; Bay St. Louis, Mississippi, June 17, 1917, one paratype. Types Cornell U., No. 594.

The four species remaining are somewhat less aberrant in character, although each is so distinct from its relatives that some would consider it worthy of a genus. It seems best to

describe the two Gelechiidae in recognized genera, as the groups of the family to which they belong are rather in need of revision as a whole.

XYLORMISA new genus (ξύλον wood and *Hormisa*).

Near *Hormisa*. Male antennae unipectinate and heavily ciliate at base, and bipectinate beyond the knot, which is about a third way out from the base, larger than is usual in *Hormisa*, and apparently not provided with curved spines; second segment of palpus more definitely upcurved, but not strongly so, the third short, and normally erect, as in *Hormisa*. Fore wing with well-marked apex; accessory cell obscure, very small and narrow, with *R*2 to 4 (veins 8 to 10) stalked from its apex.

This Noctuid genus is closely related to *Hormisa* and I might not separate it, save for the fact it will run to a different point in Schaus's Key (Proc. U. S. Nat. Mus. 50: 262). It will run to alternative 67, where it is separable by the pectinate antennae. In fact the pectinate antennae with a knot hardly occur save in *Hormisa*, which has a large normal accessory cell. The male fore legs are not unlike those of *Hormisa*, with trochanter very slender, and much longer than femur, and tarsus concealed.

Genotype: *Xylormisa louisiana* n. sp.

Xylormisa louisiana new species.

Ground light wood-brown, formed of dark brown dusting on a clay-colored base. Head and thorax paler; antenna concolorous, with the swelling somewhat darkened; palpus with second segment heavily dusted, except extreme apex, third segment dark brown, with apex more or less distinctly whitish; legs heavily dusted and shaded with blackish, especially the mid-tibia and tarsus. Abdomen lightly dusted with pale gray toward base, the apical segments of the male pale brown-gray with whitish margins, in the female not darkened.

Fore wing becoming darker at the margin; orbicular and claviform represented by vertically placed black points, reniform of two such points, with a third dot below them in the fold, postmedian line represented by a strongly outcurved series of four or five black dots between the veins, on the costal part of the wing; subterminal waved, pale, obsolete at the costa; a broken black terminal line; basal half of fringe dark gray, with pale bars in it corresponding to the black terminal bars.

Hind wing paler, being dusted with pale gray like the abdomen, with faint shaded pale postmedial and subterminal bands, parallel to the outer

margin; terminal line black, continuous, followed by a pale line in base of fringe. In the allotype the markings are fainter. Wing expanse 18 mm.

Sabine River Ferry, Louisiana, June 20, 1917, *type* ♂; Schriever, Louisiana, June 17, 1917, allotype ♀: Types, Cornell University, No. 596. There is a female from Canada in the Barnes collection, but I have no notes on it.

ARGYRACTIS Hampson, **OXYELOPHILA,** new subgenus.

Similar to those North American species formerly in *Elophila,* which are now placed by Hampson in *Argyractis* (*fulicalis, bifascialis,* etc.). Fore wing (Plate V, figure 3) strongly falcate, hind wing with *M*3 lost (as in other *Argyractis*), *M*2 and *Cu*1 stalked. Labial, and in the typical species maxillary, palpi longer and more slender than in *Argyractis,* the maxillaries flattened, and acute only in side view. Mid and hind tibiae and midtarsi flattened and fringed with hair-scales in the female, as in *A. fulicalis* and *bifascialis;* spurs fully developed. Fore wing with *R*3 typically lost, but distinct in *A.* (*O.*) *melanographta,* from Demerara, which also has reduced maxillary palpi.

A. harpalis, lanceolalis, necomalis and *ticonalis* also obviously belong to this subgenus. None of the species have the ocellate spots on the hind wing present in all the Northern species of *Argyractis.*

Apparently Hampson had an aberrant specimen of *A. bifascialis,* as he indicates that it has *M*2 and *Cu*1 stalked; in a considerable series that I have examined of both the type and the form *kearfottalis,* the veins are always separate.

Genotype: *Argyractis* (*Oxyelophila*) *callista* n. sp.

Argyractis (Oxyelophila) callista, new species.

Similar to *A. harpalis* Snellen, from Central America (Tijd. v. Ent. 43: pl. 17, f. 1). R3 lost (stalked in *harpalis,* according to Snellen). White; front with a black dot at base of antenna; abdomen with a black transverse band on base of second segment, nearly or quite interrupted in the middle; fore coxa and femur with brown streaks, tibia blackish, tarsus and middle and hind legs slightly infuscated.

Extreme base of costa with a black point; a black subbasal dot on fold, as well as the ones on costa and near inner margin; antemedial line practically complete, right-angled on *Sc* and oblique to inner margin,

with teeth on cell and fold; preceded by a broad black-brown fascia, which runs through to the costa, obliterating the second antemedial costal spot; postmedial marks as in *harpalis*, but more suffused, with the yellow on the costa replaced by dull wood brown, and the white circle partly suffused with brown; a wood brown terminal band, representing the yellow and white one of *harpalis*, defined inwardly with a clean-cut black line, which runs out into the apex, and outwardly by a blackish shade. Outer half of fringe white, with fuscous scale-tips.

Hind wing with a complete irregular antemedian band, starting at *Sc*, preceded by some blackish scaling; *discal spot strong, yellow*, defined inwardly by a few brown scales, and outwardly by an incurved blackish line; postmedian line black, erect to discal fold, then right-angled and incurved in a regular sweep to anal angle, almost touching the discal dot; followed by a second weaker line, which does not reach the costa, and is interrupted at the angle. Fringe whitish, clay colored or light wood brown at base, with traces of a black terminal line. Wing expanse, 13 mm.

New Braunfels, Texas, June 26, 1917; *holotype*, six paratypes and three other specimens in poorer condition, all females. Cornell type No. 595.

Gelechia arenella, new species.

Clay color; third joint of palpus slightly darker, and second paler on sides, with a short, smooth and slightly divided brush; antennae fuscous, tips of tegulae pale. Fore and middle legs fuscous, the midfemora and tibiae obscurely mottled and tarsi ringed with whitish.

Fore wing with darker grayish shading between the veins, leaving the veins contrastingly pale; inner and outer discal points round, and a point in the fold before the inner one, all black; a few scattered black-tipped scales, gathering into faint antemedial dots in cell and above inner margin, and along the outer margin, and forming a streak below the basal part of subcosta. Fringe concolorous. Hind wing pale pearl gray. Wing expanse 20 mm.

Woods Hole, Mass., August, 1917; *type* and five paratypes ♂, Cornell type No. 518. Rockaway Beach, New York; paratypes in Barnes collection.

This is apparently the species on which the American records of *G. petasitis* are based, but it is not even closely related, as the figures of the genitalia (Plate V, f. 4, *arenella*, f. 5, *petasitis*, at the same scale) will show. It is much more robust, and the pale veins are distinctive.

Duvita (?) tahavusella, new species. **(Tahawus is the Indian name for Mt. Marcy.)**

Scape smooth, as long as the eye, with a single long bristle near the base, representing the pecten. Palpi with second joint smooth, but considerably thickened with scales, third noticeably longer, smooth and acute. Fore wing normal, as in *Duvita* and *Aproaerema*, with *M*1 well separated from *R*4+5. Hind wing with produced apex as in *Aproaerema; R* and *M*1 stalked a third way to apex, *M*3 and *Cu*1 hardly stalked, and *M*2 somewhat approximate. Penis a sharply curved spine, articulated at the base.

Dark smoky gray, slightly shining, under a lens with pale scale-bases and dark tips. Palpi concolorous; legs blackish, contrastingly ringed with clay color, the hind tibia with pale bands at both pairs of spurs; the hind femur and inner face of tibia and tarsus contrastingly pale.

Fore wing with pale spots three-quarter way out on costa and inner margin, the costal one much larger, and with an obscure black antemedian spot in the fold, followed by some pale scales. Hind wing gray, paler. Wing expanse 11 mm.

Uphill Brook, Mt. Marcy trail, Adirondacks, New York, July 10, 1918, *type*. Peru, Adirondacks, New York, June 8, 1916, 4 paratypes. Cornell U. type No. 519.

The Mt. Marcy specimen is fresher than the others in spite of its late date, but this is doubtless on account of the high altitude (3200 ft.). This species is the first really North American Gelechiid with a pecten on the antenna, as the genera *Sitotroga* and *Pectinophora* are introductions from the Old World. A couple of European species of *Aproaerema* (*Anacampsis*) are closely similar, but I have seen no specimens of any of them with a pecten, and all five of my specimens of *tahavusella* have preserved it.

The University of Michigan-Williamson Expedition to Brazil.

The expedition left New York on December 15, 1921, as forecast in the NEWS for January, page 11. From letters from Mr. Jesse H. Williamson to members of his family we are enabled to give the following outline of the progress made. On reaching Pará they took steamer up the Amazon to Manáos, arriving there on January 13. Here they saw Dr. Rusby, of the Mulford Exploration, on his return journey to New York (see the March NEWS, page 91), and Herr Fassl, the well-known collector of insects. On the 14th they left Manáos by steamer and proceeded to and up the Rio Madeira, collecting as the stops of the vessel permitted, and disembarked at Porto Velho, "Brazil's third largest city in the Amazon basin," January 21. Here they "secured fine quarters in Hotel Brazil—connecting rooms with electric lights, shower baths, cold drinks (iced) of all kinds available, etc., at about $1.75 per day each." At last writing, February 9, they were still at Porto Velho. Showers and cloudy weather had been frequent, the temperture about 78° F., altitude 60 meters, latitude 8° 46′ South, longitude 63° 55′ West.

From Porto Velho several trips into the surrounding country had been made, that of two days by motor car on the Madeira-Mamoré Railway to Guajara, its present terminus, some 350 kilometers, being the longest.

The Phylogeny and the Geographical Distribution of the Genus Libellula (Odonata).

By CLARENCE HAMILTON KENNEDY, Ohio State University, Columbus.

(Continued from page 70.)

Group 8. (a) **Composita** Hagen. Pl. IV, fig. 15. Wyoming and Utah to southeastern California. A semidesert species of alkali sloughs. (?)

At Laws, California, August 20, 1915, in the very alkaline Owens Valley, east of the Sierra, this species was found ovipositing in a very alkaline seasonal or temporary, grassy slough made by waste irrigating water. No data were gathered as to whether the species succeeded in maturing in such a place.

This remarkable insect, which has spread probably from the dry areas of southern California, where there seems to have been a sanctuary for several primitive Odonates, stands intermediate between Group 7 and Group 8. In the penis, *composita* resembles Group 8, but in size and color of wings and body it is related to Group 7. The homologies of the parts of the penis in Group 8 were inexplicable until the penis of *composita* was examined. In it all the parts already found in the generalized *semifasciata* penis are recognizable. It is highly specialized in the large lateral lobes and the arched cornual base, but is very primitive in that the three cornua are still recognizable though rudimentary. The pattern of the wing markings suggests *nodisticta, Ladona* and the Eurasian species in which the wing markings are reduced or perhaps have never been greater. The insect is highly specialized in its pearly white eyes, the white costal border and perhaps in its curious habit of flying about in tandem with its mate. Its very restricted and erratic distribution shows it to be a relict. Just how it is related to the species of Group 8 is a question, but there is no doubt that it is associated with their ancestry.

Group 8. (b) **Jesseana** Williamson. Pl. IV, fig. 16. Enterprise, Florida, April 22, 1921. Known only from a single pond, where Jesse Williamson found these mating and ovipositing. (See Ent. News, xxxiii, pp. 13-17.)

This striking dragonfly has the coral-red wings of *auripennis* and the dark body of *incesta*. The arguments for its being a good species and not a hybrid between these species are as follows:

1. It has not been found elsewhere where the habitats of these species overlap.

2. It has the composite type one would expect in a species surviving from the Miocene times of Florida.

3. It is local in its distribution as relict species usually are.

4. It was breeding and ovipositing.

The writer is inclined to classify *jesseana* as another of the local Florida species. He believes that these originated in the Miocene when north central Florida was an island. As evidence of this, all of the half-dozen local Florida species are in northern genera because the Island of Florida was close to the Georgia coast and the Antillean lands had not yet appeared above the sea. The local Florida species of Odonata that the writer has examined are each among the primitive species of its genus, which again suggests an early origin for them. If these conclusions are true, *jesseana* gives us a fairly definite geological date for this horizon of the genus *Libellula*. *Semifasciata*, *foliata*, and *angelina* would be from below the Miocene, while Group 8 (c) and Group 8 (d) would have developed since the Miocene. The penis of *jesseana* has more of its characters like those of the species of Group 8 (d) than of Group 8 (c), but the bright red wings associate it just as much with the latter group. It is specialized in the curious supplementary lobe under the cornual base.

Group 8. (c) **Flavida** Rambur. Pl. IV, fig. 17. Atlantic and Gulf Coasts. Habits unknown.[17]

Auripennis Burm. Pl. IV, fig. 17. Atlantic and Gulf Coasts to Cuba and Mexico. A species of the ponds of the southern evergreen forest, which has penetrated the tropics as far as the Isle of Pines and Tabasco, Mexico.

Luctuosa Burm. Pl. IV, fig. 19. Maine and Florida to North Dakota and northern Mexico. A pond and sluggish stream species of the deciduous forest and prairie.

[17] In the pine barrens in New Jersey.—P. P. CALVERT.]

This is not as compact a group as for instance the *nodisticta* group. *Luctuosa* is specialized in the broad, black base of the wings and in the black and yellow body-colors. *Auripennis* is equally specialized in its coral-red color. *Flavida,* perhaps, is more generalized in that it has the general color pattern of the species of Group 8 (d), but shows the reddish cast which is so much better developed in *auripennis.*

Group 8. (d) **Axillena** Westw. Pl. IV, fig. 20. Pennsylvania to Florida and Louisiana. A species of the southern evergreen forest usually found near small streams in woods.[18]

Cyanea Fabr. Pl. IV, fig. 21. New Hampshire to Indiana and Georgia. A species of the deciduous forests, usually found about inlets or outlets of ponds.

Comanche Calv. Pl. IV, fig. 22. Montana to Texas, Mexico and California. The writer has seen but one specimen of this in the field. It was along a swampy stream.[19]

Incesta Hagen. Pl. IV, fig. 23. Maine and Wisconsin to Missouri and Florida. A vigorous, wide flier, over open ponds and streams.[18]

Vibrans Fabr. Pl. IV, fig. 24. Maine to Missouri and Florida in woods swamps.[18]

Because of the great difference between the penis of *axillena* and that organ in the other species of this group, *axillena* may not belong in the group.

This group appears to be very modern in that the species are very close. While the penes show all of them to be good and distinct species, the writer has been unable to unscramble their relationships to his satisfaction. *Axillena* and *vibrans,* by penis characters, are very different, also by the same criteria *incesta* is closer to *comanche* and *cyanea* than to *vibrans* and *axillena.* Probably they are a complex of mutants with various combinations of a limited set of characters. The following four pairs of characters appear in the group:

1.1 Dark face	1.2 White face
2.1 Nodal spot	2.2 No nodal spot
3.1 Basal spot	3.2 No basal spot
4.1 Dark stigma	4.2 Pale stigma

[18] Jesse and E. B. Williamson to the writer.

[19] Along the outlet of the sulphur springs at Santa Rosalia, Chihuahua, Mexico.—P. P. CALVERT.]

These combine as shown in the following lists:

axillena	*vibrans*	*incesta*	*cyanea*	*comanche*
1.1	1.2	1.1	1.1	1.2
2.1	2.1	2.2	2.2	2.2
3.1	3.1	3.2	3.1	3.2
4.1	4.1	4.1	4.1-2	4.2

By this scheme *comanche* appears to be a pale *axillena*. The other species are various intermediate combinations of these paired characters. *Comanche*[20] is also the only desert species of this group. Probably it has entered the desert from the east. This *axillena* group represents the very apex of North American Odonate evolution, if we consider the Libellulidae as the apical Odonate family.

Group 9. **Depressa** Linn. Pl. IV, fig. 25. England to Russia and Persia, south to Sicily. Ponds.[21]

This is definitely a European offshoot from the *Plathemis* stock. It may have been traded to Eurasia when 4-*maculata* came to America, but the difference between it and the two species of *Plathemis* is great enough to suggest that it branched off much earlier.

Group 10. **Quadrimaculata** Linn. Pl. IV, fig. 26. England to Spain, Kashmir and Japan. In America from Newfoundland to Alaska, south in the mountains to North Carolina and California. I cannot trace Muttkowski's[22] Arkansas record.

The nearest relative of this species is *angelina* of Japan. *Quadrimaculata* probably entered North America recently as it has no near relatives on this continent. It may have come in when the very modern *Enallagma cyathigerum* entered Eurasia, as the two have the same distribution. It is very modern and highly specialized in its intense activity.

Group 11. **Fulva** Muell. Pl. IV, fig. 27. England to Italy, Denmark to Transcaucasia. Moor swamps and slow-flowing brooks, more (often found) in the mountainous regions.[23]

[20] Is it possible that our Odonata tend to form a pale desert fauna? Offhand the writer recalls *Ophiogomphus nevadensis, Gomphus nevadensis, Gomphus intricatus, Sympetrum madidum, Sympetrum corruptum, Libellula composita* and *Ischnura barberi*.

[21] Fröhlich in Die Odonaten u. Orthopteren Deutschlands, p. 13, 1903, states that this species is found from May to July, common about all smaller pools, swamp and peat ponds.

[22] Catalogue of the Odonata of North America, p. 140, 1910.

[23] Fröhlich, Odonaten u. Orthopteren Deutschlands, p. 11, Jena, 1903.

This is a remnant of the preglacial fauna of Eurasia, so that it has no near relatives. It is remarkably specialized in the penis which has a large inflated tip. *Pontia*, which Ris rates as a variety, the writer has not seen.

From the foregoing discussion the writer believes that this method of investigation as a preliminary to a study of the geographical distribution of a group of species is sound and furnishes data as to relationships not easily arrived at from other methods. The writer admits that he has used other characters very little, though they agree as far as he has checked them. To summarize:

1. *Semifasciata* is the most generalized living species and so probably the most primitive.

2. The genus *Libellula* originated in the eastern hemisphere because there we find the large genus *Orthetrum*, placed by many writers close to *Libellula*, in which the penis has the straight lateral lobes of the less specialized Libellulas. See the figure of an *Orthetrum* penis in the preceding article, Ent. News, vol. xxxiii, Pl. II, fig. 14, 1922.

3. Our southwestern species, *subornata, foliata, nodisticta* and *composita*, are the American species most nearly related to the Eurasian Libellulas. This taken in connection with the fact that the most primitive species, *semifasciata*, is in eastern America, might mean that the genus originated in America and spread to Eurasia, later sending northern species back to America.

4. These southwestern primitive species indicate a Mexico-California faunal centre, which with its long unaltered climate has been an asylum for various primitive Odonates, and from which developed Group 4, Group 7 and Group 8.

5. The species with broad lateral lobes comprised in Groups 3, 5, 6, 9 and 10 have probably been distributed to America from Eurasia. This is indicated by the fact that their connecting links are not in America, that three of these, Groups 3, 9 and 10, are Eurasian to start with.

6. *Depressa* and *fulva* are the most specialized away from the primitive *semifasciata* penis of any of the Libellulas. (The extreme specialization of *Plathemis* and *Ladona* suggests that their stock may have been developed in Eurasia.) It is of com-

mon knowledge to distributionists that the Eurasian fauna and flora are about one geological age in advance of the American.

7. The Palaearctic species, because of their lack of near relatives and because of their unrelatedness *inter se* are the remnants of a preglacial fauna, a fauna that was largely wiped out when caught between the ice and the southern mountains.

8. The holarctic 4-*maculata* originated in Eurasia as it has no near relatives in America.

9. The genus as it exists in America today represents at least three levels of development as are indicated by the horizontal lines on Plate IV.

10. The tropical Libellulas have probably entered the tropics from the north or have been developed from northern stock, also *Ladona* developed from the north to the south.

11. *Orthemis* with a penis that has broad lateral lobes may be an American offshoot of the Libellulas with broad lateral lobes.

12. *Libellula jesseana* gives us a Miocene date for its level in the genus.

From the foregoing it appears that the genus *Libellula* originated in a mild climate in premiocene times, but eventually developed species into both the Transition and Subtropical Zones; that its dominance is past in Eurasia but is at its height in North America.

One point of general interest is that in a species or series of species of *Libellula* extending from north to south, the southern individuals or species are small. Ris (Libellulinen, Coll. Selys) states that in *fulva* and *depressa* examples from the southern portions of their habitats are smaller. The same author states that the Cuban *auripennis* is smaller than the American, that the smallest examples of *herculea* come from Paraguay. However, in the last case the species is small in Mexico on the northern border of its range. In *Ladona* the northern species, *julia,* is largest, the southern species, *deplanata,* smallest.[24] Dr. W. T. M. Forbes has pointed out to the writer that the same is true in some North American Lepidoptera as they are usually smallest on the southern edge of their range. Probably

[24] The reverse is true, according to Dr. Calvert, in *Agrion maculatum, Gomphus dilatatus,* etc.

it means that they have spread into a region where life conditions are not optimum.

The primitive color in the genus appears to have been brown because, 1. *semifasciata* is brown; 2. the females of several of the species are brownish; however, the gray and yellow color pattern of the high Group 8 (d) is found also in the genus *Orthetrum*. Apparently the bright reds of *auripennis* and of *saturata* have developed independently of each other..

Probably the primitive wing had three broad spots or bands, basal, nodal and apical, but just how this pattern is handed down through the various lines is baffling. These bands in whole or in part may disappear in a series to reappear in some apical species. They may disappear in one sex, as in the female of *lydia*,[25] or may appear in individuals of a species usually without them, as in the form *praenubila* of 4-*maculata*. Perhaps their genes are always present but are inhibited at times by other factors.

The writer believes that the genitalia in this genus show relationships so clearly that the subgenera can be defined by them. They certainly can be lined up much better than they were by Kirby.[26] The writer's views are substantially those indicated in Ris' key to this genus in his *Libellulinen* in the "Coll. Zool. du Selys." The species fall into ten subgenera, as follows:

1. EOLIBELLULA subgen. nov., type = *semifasciata*.
2. BELONIA Kirby, type = *foliata;* includes also *saturata, croceipennis* and *herculea*.
3. SYNTETRUM subgen. nov., type = *angelina*.
4. LIBELLULA Linn., type = 4-*maculata;* includes *praenubila* and probably *basilinea*.
5. LADONA Needham, type = *exusta;* includes also *julia* and *deplanata*.
6. PLATHEMIS Hagen, type = *lydia;* includes also *subornata*.
7. PLATETRUM Newman, type = *depressa*.
8. EUROTHEMIS subgen. nov., type = *fulva;* includes, probably, *pontica*.
9. NEOTETRUM subgen. nov., type = *forensis;* includes also *pulchella* and *nodisticta*.
10. HOLOTANIA Kirby, type = *axillena;* includes also *composita, jesseana, flavida, auripennis, luctuosa, cyanea, comanche, incesta* and *vibrans*.

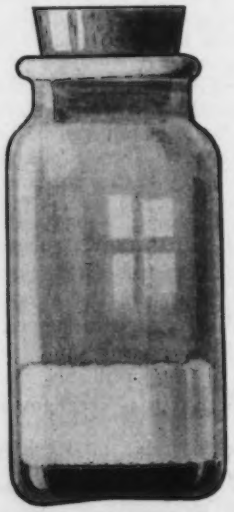
[25] Kennedy, Odonata of Kansas, Bull. Kans. Univ., vol. 18, pl. VII, figs. 108-110, 1917.

[26] Kirby, Revision of the Libellulinae, 1889. Catalogue of the Odonata, 1890.

A Carbon-tetrachloride Killing Bottle.

By GAYLORD C. HALL, New York City.

There has been a growing tendency for some years past to use carbon-tetrachloride as a killing agent for insects. The writer began experimenting with it several years ago and during the last summer tried out seriously a killing bottle using this fluid. The apparatus, which is shown in the accompanying sketch, consists of a bottle of convenient size, in the bottom of which is placed a piece of felt, which in turn is covered by a layer of cotton. Carbon-tetrachloride is poured in until the felt is saturated and the bottle is ready for use.



The fumes of the tetrachloride are very heavy and therefore have a tendency to stay in the bottle as long as it is not inverted. For this reason it is best to remove specimens from the bottle with forceps which reach the cotton and thus keep the bottle upright. Likewise in getting the specimens from the net into the bottle it is better to keep it as nearly upright as possible.

The effect of the tetrachloride upon Lepidoptera is surprisingly quick. Usually the insect has ceased struggling and is lying inert on the cotton (alas! with wings reversed) by the time the cork is replaced, that is, in a few seconds. Should it be desirable to bring the wings back to their normal position, the butterfly can be taken out, the wings reversed, and dropped back again as with a cyanide bottle. I have found that fifteen minutes is ample time for killing and prefer to take the specimens out after that period has elapsed. I always put them immediately into a metal box kept moist by means of wet blotting-paper or otherwise, as that treatment seems to prevent or at least minimize the rigor mortis. During the last summer I caught and set several hundred specimens,

some set the same day as caught and many at a later date after the usual relaxing process, and have had practically no trouble from stiff wings.

In making up the killing bottle use a piece of felt at least a quarter of an inch thick. It can be bought under the name of laundry felt or moulder's cloth. It should be cut so as to make a tight fit in the bottom of the bottle. This can be done by the cut and try method, leaving the felt slightly larger than the inside diameter of the bottle so that it has to be forced down into place. The felt will then be tight and will not fall out when the bottle is inverted. Over the felt place a piece of cotton to the depth of at least one inch. In making this mat of cotton care should be taken that it makes a fairly tight fit against the sides of the bottle and that the edges are not rounded downward. This is important for if rounded, small specimens slide down, become wet with the tetrachloride and stick to the glass, and may be ruined in trying to remove them. The tetrachloride itself does not seem to harm the specimens. In pouring the tetrachloride, slightly part the cotton from the glass, using a pencil, as one is usually at hand, and pour the fluid down the side into the felt without wetting the cotton, tipping the bottle slightly to one side in the meantime.

The bottle properly prepared, *i. e.*, with the felt well wet, will last at least one day in active service. I used to carry a small bottle of the fluid in the field in order to recharge, but found that that was not necessary. The bottle when corked, will keep for months. The carbon-tetrachloride can be bought at any chemist's and there are also some cleaning fluids such as Carbona which seem to be composed largely of it and which answer the purpose perfectly.

The carbon-tetrachloride would seem to lend itself easily to other methods of killing insect and other pests, due to its extremely heavy vapor and absolute fire-proof quality, and we may expect development along this line in the future.

[*Note.* Very frequently boys and girls wish to collect insects and it has not been considered safe or wise to allow them to use cyanide bottles. At present it is difficult to purchase small quantities of cyanide, on account of the regulations in regard to the sale of poisons. Carbon tetrachloride would supply a harmless preparation for both children and adults. For certain insects that have long tarsal claws, it would be necessary to put something smooth over the cotton, with perforations, if necessary, to permit the gas to escape into the bottle. H. S.]

Enallagmas Collected in Florida and South Carolina by Jesse H. Williamson with Descriptions of Two New Species (Odonata, Agrionidae).

By E. B. WILLIAMSON, Bluffton, Indiana.

(Plate VI)

Mr. Williamson collected dragonflies in Florida from March 1 to April 26, 1921. Localities visited and dates are as follows: Sebring, March 1; Fort Myers, March 3-7 and 10-19; Taxambas, Marco Island, March 8; Labelle, March 21-27; Moore Haven, March 29 and 30, and April 2; Palmdale, March 31 and April 3-8; enroute Moore Haven to West Palm Beach, across Lake Okeechobee, April 9; Miami, April 12; Enterprise, April 15-26. From April 29 to May 9 he collected at Kathwood, Aiken County, South Carolina, but at this time most of the species observed were just emerging. Mr. Williamson has distributed his Florida dragonflies into twenty-five sets which he has donated to students of Odonata.

Dr. Calvert's recent paper, *Gundlach's Work on the Odonata of Cuba*, (Trans. Am. Ent. Soc., XLV, 1919) contains a careful study of certain Enallagmas, related to *Enallagma truncatum*, which may be designated as the *pollutum* group. This work of Dr. Calvert's has made possible the recognition of two undescribed species of the group from Florida. The following descriptions of these species follow the form of Calvert's descriptions and are supplementary to his paper.

Enallagma sulcatum new species (Pl. VI, Figs. 1-5).

♂. Superior appendages in profile view with the apical margin subequal to the inferior margin, produced; in dorsal view, the intero-inferior lamella reaching far beyond the level of the supero-internal apical hook.

Nasus shining black, with a small pale area on either side (similar to that of *truncatum* in Calvert's figure 1, except that the black extends nearly or quite to the anterior and lateral margins), to largely orange with a transverse bar across the base and another paralleling the anterior margin, these bars connected or not at their extremities and in the median line, and the anterior bar sometimes broken with orange.

Frons: pale color of the anterior surface not reaching the yellow or orange spot immediately anterior to the median ocellus; in some specimens the black anteriorly is slightly more reduced than in figure 4.

Pale postocular spots linear-cuneiform, not confluent with the pale color of the rear of the head, being separated therefrom by a broad bar of black across the rear of the head above.

Middle prothoracic lobe in dorsal view predominately black, a yellow or orange spot each side, no median twin spots or stripes.

Width of black middorsal thoracic stripe about .87, of pale antehumeral about .26, of black humeral about .55 mm.

Second lateral thoracic suture with a black stripe on about the upper five-sixths of its length, continued as a thread of black to the inferior end of the suture.

Abdominal segment 9 blue.

♀. Mesostigmal lamina largely black, with a pale stripe which includes the dorsal tubercle and extends downward and slightly forward; the posterior and inferior black portion of the lamina grooved (hence the specific name) to receive the dorsal branch of the superior appendage of the male; this groove produced dorsally and anteriorly across the pale stripe slightly below the dorsal tubercle, at which point the pale stripe is more or less interrupted.

Antero-mesal angle of the pale antehumeral stripe elevated and prominent, but not produced into a tubercle.

Width of the black middorsal thoracic stripe about .78, of pale antehumeral about .27, of black humeral about .5 mm.

Second lateral thoracic suture with a black stripe on slightly less than the upper five-sixths of its length, continued as a thread of black to the inferior end of the suture.

Black on dorsum of abdominal segment 9 with the sides nearly parallel or narrowing caudad, and extending from the base to from two-thirds to three-fourths the length of the segment.

Abdomen ♂ 27-28, ♀ 26.5-29; hind wing ♂ 16.5-17.5, ♀ 17-19; stigma front wing ♂ .6-.67, ♀ .67, of hind wing ♂ .67, ♀ .7-.83 mm.

Anal bridge separating from the hind margin proximal to Cu-A a distance about equal to to slightly greater than the length of Cu-A. M2 front wing arising at or near the fourth postnodal in 5 male wings, at or near the fifth postnodal in 5 male and 8 female wings; M2 hind wing arising at or near the fourth postnodal in 10 male wings and 8 female wings; M1a front wing arising at the seventh postnodal in 10 male wings and 2 female wings, at the eighth postnodal in 6 female wings; M1a hind wing arising at the seventh postnodal in 10 male wings and 7 female wings, at the eighth postnodal in 1 female wing.

Material examined: Gotha, Florida, June 23, 1898, through James Tough, ♂, coll. E. B. W.; Enterprise, Florida, April 18, 19, 21, 25 and 26, 1921, J. H. Williamson, 7 ♂, 4 ♀. *Type* ♂ April 26, *allotype* ♀ April 19, coll. E. B. W. This

species was taken by Mr. Williamson at Gleason's Pond, Buckeye Homestead Pond, Quackenbos Pond, and a small swamp about a quarter of a mile east of Gleason's Pond.

The male of *sulcatum* runs out in Calvert's key to *truncatum* and *pollutum*, with the postocular spots more linear than cuneiform. From *truncatum* it is separated at once by the form of the appendages and by the more extensive pale areas on the head in dorsal view. From *pollutum* it is separated at once by having the ninth segment blue, not yellow or orange, and by the form of the appendages.

Writing of the males of *vesperum* and *signatum* Dr. Calvert (p. 376, loc. cit.) says he has found no constant color differences. I have seen many specimens of both species and in every case abdominal segment 9 of *signatum* has been yellow and of *vesperum* blue, but Dr. Calvert writes me that a specimen of *signatum* from Indiana seen by him had 9 blue. This coloration is certainly rare, and in the case of the specimen seen by Dr. Calvert may have been due to some adventitous cause. In the same way, all the males of *pollutum* seen by me have 9 yellow. The males of *vesperum* and *sulcatum* are alike in having 9 blue, and there is a superficial resemblance in the shape of the appendages. But *sulcatum* is at once separated from *vesperum* and from all other species of the *pollutum* group, by having the pale, less chitinized, intero-inferior lamella produced apically beyond the level of the darker, more chitinized, externo-superior branch of the superior appendages. In *vesperum* the mesal edge of the intero-inferior lamella is emarginate; in *sulcatum* it is entire and slightly concave as shown in figure 3.

In Calvert's key to the known females of the group, *sulcatum* runs out to *signatum* and *pollutum*, which are separated in the key by the presence in *signatum* and absence in *pollutum* of mesepisternal tubercles. *Sulcatum* seems more like *pollutum*, as contrasted with *signatum*, in this character, which, however, is not always readily recognized. It is variable (in *vesperum*) according to Calvert, and among specimens of all the known species, I have found the tubercle absent in at least some of the specimens of all the species except *signatum*.

The female of *sulcatum* is further defined in a brief key to the known females following the description of *E. concisum*.

Specimens of *sulcatum* have been studied by Dr. Calvert and in his opinion the species is distinct.

Enallagma concisum new species (Pl. VI, Figs. 6-10).

♂. Superior appendage in profile view with the apical margin about two-thirds as long as the inferior margin, oblique, nearly straight, and not bilobed but with the inferior apical angle of the intero-inferior lamella slightly enlarged. In dorsal view the intero-inferior lamella reaches the level or nearly the level of the supero-internal subapical hook but the dorso-apical portion of the intero-inferior lamella is produced obliquely apically to fuse with the externo-superior branch of the appendage, so the distinction between the externo-superior branch and the intero-inferior lamella is not well marked in the subapical part of the appendage as it is in corresponding parts of *pictum*. This results from the greater length of the externo-superior branch of the appendage in *concisum* as compared with *pictum*, and it is in *concisum* that the supero-internal subapical tooth is relatively more apical and therefore more reduced.

Nasus orange, a transverse basal black stripe and on either side, at mid-length, a small brown to black depression.

Frons: pale color of its anterior surface on either side reaching the level of the median ocellus, but the latter is bordered in front with a small pale area of varying size and an anteriorly projecting quadrangle of black, the latter often unsymmetrical, and in one case broken, so the small yellow area in front of and adjacent to the median ocellus is joined on one side with the anterior orange color of the frons.

Pale postocular spots linear cuneiform, widely separated by black from the pale color on the rear of the head below.

Prothorax shining greenish black, front and hind lobes broadly edged with orange; and sides of middle lobe paler orange; dorsum of middle lobe with a round orange spot, varying greatly in size on either side, and with a median orange geminate spot of varying size present or wanting.

Width of black middorsal thoracic stripe about .67, of pale antehumeral about .33, of black humeral about .43 mm.

Second lateral suture with a black stripe its entire length, widening posteriorly from a narrow line at its anterior end.

Abdominal segment 9 orange on the sides below, dorsum black except the apical membranous ring which is orange.

♀. Mesostigmal lamina largely pale, the upper half, anterior to the pale vertical posterior inflated carina, and a very narrow border, posterior to this carina, black.

The merest prominence and no trace of a tubercle on the anteromesal angle of the pale antehumeral stripe.

Width of black middorsal thoracic stripe about .7, of the antehumeral about .35, of black humeral about .44 mm.

Second lateral thoracic suture with a black stripe its entire length, widening posteriorly from a narrow line at its anterior end.

Black on dorsum of abdominal segment 9 of uniform width.

Abdomen ♂ 24.5-25.5, ♀ 26; hind wing ♂ 14.5, ♀ 17; stigma front wing ♂ .5-.53, ♀ .61, of hind wing ♂ .5-.53, ♀ .67 mm.

Anal bridge in front wing separating from the hind margin proximal to Cu-A a distance equal to about one and one-half times the length of Cu-A; in the hind wing a distance slightly greater than the length of Cu-A. M2 front wing arising at or near the fourth postnodal in 2 male wings, at or near the fifth postnodal in 8 male and 2 female wings; M2 hind wing arising at or near the fourth postnodal in 10 male and 2 female wings; M1a front wing arising at the seventh postnodal in 6 male and 2 female wings, at the eighth postnodal in 4 male wings; M1a hind wing arising at the sixth postnodal in 3 male and 1 female wings, at the seventh postnodal in 7 male and 1 female wings.

Material examined: Buckeye Homestead Pond, Enterprise, Florida, April 21 and 26, 1921, J. H. Williamson, 13 ♂, 1 ♀; *Type* ♂ and *allotype* ♀, April 21, coll. E. B. W.

Mr. Williamson noted of this species on April 21; "Occurred at Buckeye (Homestead) Pond. Generally found resting in inner ring of vegetation where the water was about waist deep. Seen only at rest and hard to find."

(To be continued)

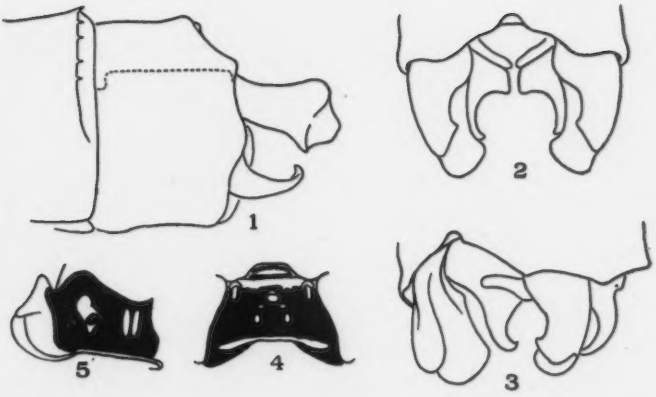
EXPLANATION OF PLATE VI.

Figs. 1-5. *Enallagma sulcatum* n. sp. Figs. 1-3, appendages of the ♂ type in lateral, dorsal and dorso-oblique views. Fig. 4, dorsal view of head of ♂ type. Fig. 5, dorso-oblique view of middle lobe of prothorax of ♀ allotype.

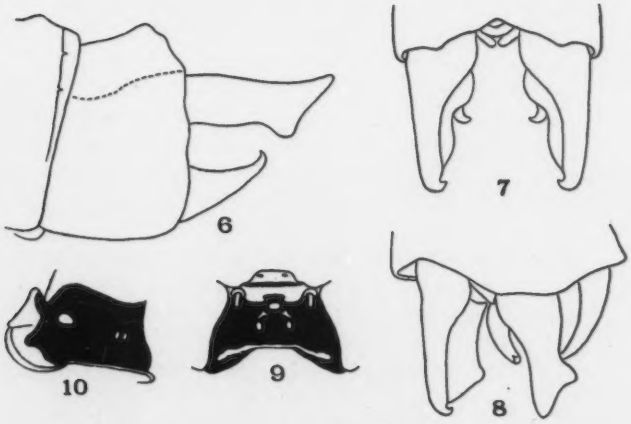
Figs. 6-10. *Enallagma concisum* n. sp. Figs. 6-8, appendages of ♂ type in lateral, dorsal and dorso-oblique views. Fig. 9, dorsal view of head of ♂ type. Fig. 10, dorso-oblique view of middle lobe of prothorax of ♀ allotype.

Information on Bibliographies and Catalogs Wanted.

The Division of Biology and Agriculture and the Research Information Service, National Research Council, are undertaking a canvas of manuscript and published bibliographies on plant and animal biology, and of manuscript of plants and animals (recent and fossil), with the view of relieving the needs of working biologists along these lines. Blank forms for reporting such information may be obtained from C. J. West of the Council, 1701 Massachusetts Ave., Washington, D. C.



Enallagma sulcatum n. sp.; figs. 1-4, male; fig. 5, female.



Enallagma concisum n. sp.; figs. 6-9, male; fig. 10, female.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., APRIL, 1922.

Zoological Bibliographies

In the March number of the NEWS, page 91, we published a note headed "Save the Zoological Record!" Elsewhere in the present issue is a statement concerning resumption of publication by the Concilium Bibliographicum. Each of these bibliographical agencies appears to have its partisans who see nothing good in the other. Both have done good in the past and the plan of publication which each has followed has some advantages lacking in the other.

For individuals working in a limited field the cards of the Concilium are of very great assistance,* as they permit one to associate each year's cards relating to any given subject, or to the works of a given author, with similar cards of preceding years, according to the recipient's preferences and mode of work. This obviates the necessity of examining separate volumes each devoted to the literature of but a single year, Experience, too, has shown that the cards for limited groups are distributed at a shorter interval after publication of the literature than has been found practicable with the volumes of the *Record*.

For an institution including a number of investigators interested in different divisions of the animal kingdom and of Zoology, the book form is doubtless the better, since the immense number of cards (due to the extent of the whole field of this science and the quantity of papers published) demands constant service to sort and interpolate the cards and few establishments are able to supply this. The entire series of cards for even one year necessarily occupies a much larger space than a volume containing the same number of references. This, too, is an important consideration. But even when the

*See the NEWS for June, 1921, pages 182-3.

volume form is received by an institution, the cards relating to one or more taxonomic groups, or to one or more topics as physiology or anatomy, are often of great aid to an individual working therein.

The book form is furnished both by the *Zoological Record* and the *Bibliographica Zoologica* of the Concilium. Opinions doubtless vary as to which of these is more conveniently arranged. Both necessarily include many cross-references and their usefulness is measured, to a great degree, by the completeness of these. This also applies to the cards. No great research is required to discover, even in the latest issues of all three series, that the cross-references are by no means complete and that dependence on them will not furnish the reader with all the references on a given subject that each volume or set of cards contains.

It is a great pity that two distinct organizations exist for the same purpose and it would seem to be true economy, especially in these days, for the two bodies to combine their labors for the greatest benefit of workers in all branches of Zoology and, united or co-operating, continue to issue volumes (annually or oftener) and cards, to suit the different needs of institutions and individuals. Happily, we understand, negotiations with such an end in view are under way. But whatever may be their outcome, financial support from all using these bibliographies is an absolute necessity and we can not urge too strongly the duty of all Zoologists (including entomologists) to sustain and strengthen these publications.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Aphis-Lion Attacking Man (Neur., Chrysopidae).

The following observation may be of interest as a case of a predaceous insect attacking man without provocation.

With the exception of such insects which, like mosquitoes and blood-sucking flies, depend upon blood as food, insects will not generally attack man unless taken in the fingers or perhaps entangled in the

clothing. Under such conditions practically all insects with biting mouthparts—beetles, grasshoppers, the larger caterpillars, and even Dipterous larvae (Tipulidae, Tabanidae)—will make use of their mandibles, but they will hardly ever attack spontaneously.

In August, 1918, at Princeton, New Jersey, I was frequently compelled, through asthmatic attacks, to sit down on certain low stone walls forming the border of the university campus and shaded by maple and sycamore trees which were badly infested with Aphids. On such an occasion I suddenly felt a painful bite or sting on the wrist of the left hand which was on the stone. Looking for the cause, I discovered on the hand the larva of the lace-winged fly, *Chrysopa* spec., commonly called Aphis-lion, which insect had sunk both its long, hollow mandibles deep into the skin, as if for sucking, and when being removed, was not at all willing to give up. The larva had, apparently, dropped from one of the trees, and finding itself hungry, proceeded, in the absence of aphids, to attack the next best living prey it could get hold of. A few hours later the same thing was experienced a second time. Again I had placed my hand on the stone; after a few minutes a painful prick was felt, the cause of which was found to be an aphis-lion sitting on the upper side of the hand, the mandibles deeply inserted. Whether it had climbed on the hand or dropped from the tree above I was unable to ascertain. The specimens were greenish with black markings, but were not preserved.

This observation appears to show that *Chrysopa* larvae will occasionally attack man spontaneously and thus assume the role of a facultative parasite.—WERNER MARCHAND, Mendham, New Jersey.

Note on Abundance of Mosquitoes (Dip., Culicidae).

Mr. George C. Shupee, Federal Game Warden, has sent in an interesting note on a plague of mosquitoes on the north Texas coast which should be made available to entomologists. His account dated High Island, Texas, Oct. 29, 1921, is substantially as follows:

Old residents say they never were so bad before, millions and millions of them; so many perched on the automobile that one could not tell there was a glass in the back of the car. They have killed lots of cotton-tail rabbits, and every now and then meadowlarks and other birds are found dead, apparently from the ravages of the mosquitoes. The stock have either gone to the high ridges or come to the gulf where they wade out deep. A large boar hog appeared to go crazy on account of their attacks; he ran into the gulf and swam out about 1½ miles, and was given up; he disappeared from sight time and time again in the surf, but finally he came back in. Those hunters who are going in after ducks surely earn them, wearing heavy leather gloves and stiff canvas coat, with mosquito net over head; despite all that the pests still bite, actually biting through the glove. I never experienced them so bad. Some days ago a norther blew them out into the gulf; they were drowned and washed into shore, and from Bolivar to Sabine, about 75 miles, a strip four inches wide and two deep was left along the beach. Notwithstanding this occurrence there remain apparently just as many of the mosquitoes as before.

Most of us have heard of windrows of brine-flies (*Ephydra*) being cast up on the beaches of certain western lakes, but probably few have imagined that mosquitoes ever figured in a similar phenomenon.—W. L. MCATEE, U. S. Biological Survey, Washington, D. C.

To the American Subscribers of the Concilium Bibliographicum (Zurich).

The difficulties created by the war and after-war conditions and by the death of Director Dr. H. H. Field have interrupted, from 1917 until recently, the sending out of bibliographic cards and of the Bibliographia Zoologica. During this time, however, work has continued, although in restricted degree, on preparing references, and Vol. 30 of the Bibliographia Zoologica and certain cards have recently been sent out to subscribers.

The difficulties of the Concilium Bibliographicum caused by the war, the uncertainties of exchange since the war and, finally, by the death of Dr. Field have been so great as to threaten seriously the continuance of its existence. But arrangements are now in process of accomplishment by which the continued existence of the Concilium is assured and the maintenance and even gradual expansion of its bibliographic service provided for. These arrangements have been made possible by a co-operation of the Swiss Society of Natural Sciences, the National Research Council (Washington) and the Rockefeller Foundation (New York), by which all current obligations of the Concilium are paid, a certain sum is given to Mrs. Field in partial recognition of hitherto unpaid services of Dr. Field, and financial provision is made for assistance in meeting the current expenses of the Concilium for five years.

A provisional managing committee composed of representatives of the Swiss Society of Natural Sciences and of the National Research Council will assume the present control of the Concilium, with Prof. Dr. J. Strohl of the Zoological Institute of the University of Zurich as Director. Full details of the new arrangements for the reorganization of the Concilium and proposed plans for a possible extension of its work will be published as soon as the arrangements are formally and legally made.

In the meantime the making of the references and the preparation and printing of the bibliographic cards will be vigorously pushed and subscribers may be confident that they will again begin to receive cards regularly, and that references to papers which appeared during the war and in the first years after it as well as references to papers in current periodicals will be sent them. An energetic campaign for the confirmation of old and for obtaining new subscriptions will be begun at once. The campaign for American subscriptions will be undertaken by the National Research Council which will represent the interests of the Concilium in America. The campaign in Europe will be made by correspondence from Zurich and by personal visits to various countries by the Director of the Concilium. Special requests for information concerning the Concilium may be made by American subscribers directly to the National Research Council (Washington). Dr. Jean Strohl, Director of the Concilium Bibliographicum. Dr. K. Hescheler, Chairman, Committee on Concilium Bibliographicum, Swiss Society of Natural Sciences. Dr. Vernon Kellogg, Chairman, Committee on Concilium Bibliographicum, National Research Council. Zurich, February 1922.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

2—Transactions of the American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **6**—Journal of the New York Entomological Society. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **16**—The Lepidopterist, Salem, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **28**—Entomologisk Tidskrift, Uppsala. **29**—Annual Report of the Entomological Society of Ontario, Toronto, Canada. **39**—The Florida Entomologist, Gainesville, Florida. **41**—Bulletin de la Societe Entomologique Suisse, Bern. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipsic. **58**—New York State Museum Bulletin, Albany. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **82**—The Ohio Journal of Science, Columbus. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **99**—Bulletin du Museum National d'Histoire Naturelle, Paris. **108**—Journal of Genetics, Cambridge, England. **109**—Annales Historico-Naturales Musei Nationalis Hungarici, Budapest. **110**—Naturwissenschaftliche Wochenschrift, Jena. **111**—Archiv fur Naturgeschichte, Berlin. **134**—Annales de Biologie Lacustre, Brussels. **135**—Schriften der Physikalisch-okonomischen Gesellschaft zu Konigsberg in Pr. **136**—Archivos da Escola Superior de Agricultura e Medicina Veterinaria, Nictheroy (E. do Rio de Janeiro). **137**—Zeitschrift des Osterreichischen Entomologen-Vereines Wien.

GENERAL. da Costa Lima, A.—Notas entomologicas. Technica para a preparacao e montagem de pequenos insectos para exame microscopico. **136,** v, 97-121; 123-26. **Fyles, T. W.**—Obituary by C. J. S. Bethune. **4,** liii, 262-64. **Lucas, W. J.**—The order Neu-

roptera. [Answer to a question from G. V. Hudson.] **9,** 1922, 61-2. **Metcalf, Z. P.**—The age of insects. (Jour. Elisha Mitchell Sci. Soc., xxxvii, 19-53.) **Sladen, F. W. L.**—Obituary. **4,** liii, 240. **Smiths. Inst.**—Opinions (68-77) rendered by the International commission on zoological nomenclature. (Smiths. Miscel. Coll., lxxiii, No. 1.) **Tarbat, J. E.**—Non-attractiveness of electric light. **9,** 1922, 64-5. **Weiss & Dickerson**—Notes on milkweed insects in New Jersey. **6,** xxix, 123-45.

ANATOMY, PHYSIOLOGY, ETC. Christeller, E.—Untersuchungen an kunstlich hervorgebrachten hermaphroditen bei schmetterlingen. **135,** lix, 1-20. **Dampf, A.**—Uber innere begattungszeichen bei Tortriciden. **135,** lxi, 66-8. **Feuerborn, H.**—Das labialsegment, die gliederung des thorax und die stigmenverteilung der insekten in neuer beleuchtung. **52,** liv, 49-78, 97-111. **Harrison, L.**—Notes on the mouth-parts of lice. (Australian Zoologist, i, 214-16.) **Macfie, J. W. S.**—The effect of saline solutions and sea water on Stegomyia fasciata. **98,** xv, 377-80. **Meyer, R.**—Die pollensammelapparate der bauchsammelnden bienen (Gastrilegidae). (Jen. Zeit. f. Naturw., Jena, lvii, 229-68.) **Onslow, H.**—The inheritance of wing colour in lepidoptera. **108,** xi, 277-98. **Osorio de Almeida, M.**—Les reflexes musculaires. **136,** v, 127-41. **Schweizer, C.**—Der darmkanal des maikafers. **110,** xxi, 78-81. **Speyer, W.**—Die lokomotorischen extremitaten der larve von Dytiscus marginalis. **135,** lxi, 43-54. **Stumper, R.**—Nouvelles observations sur le venin des fourmis. **69,** clxxiv, 413-15. **Thienemann, A.**—Die metamorphose der Chironomidengattungen Camptocladius, . . . mit bemerkungen uber die artdifferenzierung bei den Chironomiden uberhaupt. (Arch. f. Hydrobiologie, Stuttgart, ii, Suppl., 809-850.) **Zavrel & Thienemann**—Die metamorphose der Tanypinen. (Arch. f. Hydrobiologie, Stuttgart, ii, Suppl., 655-784.)

ARACHNIDA, ETC. Chamberlain, R. V.—On some Chilopods and Diplopods from Knox Co., Tennessee. On some arachnids from southern Utah. **4,** liii, 230-33; 245-47.

NEUROPTERA. Dohler, W.—Beitrage zur systematik und biologie der Trichopteren. (Sitz. Naturf. Gesell., Leipzig, 1914, 28-102.) **Lestage, J. A.**—Etudes sur la biologie des Plecopteres. **134,** ix, 257-68. **Morstatt, H.**—Zur standischen gliederung und ernahrungsbiologie der Termiten. **41,** xi, 9-16. **Tillyard, R. J.**—Revision of the family Eustheniidae (Order Perlaria) with descriptions of new g. and sps. **29,** xlvi, 221-36. **Walker, E. M.**—The nymph and breeding place of Aeshna sitchensis. **4,** liii, 221-26.

Davis, W. T.—A new dragonfly from Florida. **19,** xvi, 109-11. **Howe, R. H.**—A new dragonfly from New England. (Oc. Pap. Boston Soc. N. H., v, 19-20.)

ORTHOPTERA. Hebard, M.—The janeirensis group of the genus Euborellia, with the description of a new species. (Dermaptera.) **2,** xlvii, 319-24. **Rehn, J. A. G.**—Studies in Costa Rican Dermaptera and Orthoptera. I. Two new genera and three new species of Dermaptera. **2,** xlvii, 307-18.

HEMIPTERA. Correction.—Under Hemiptera in the February number, the reference for Porter should be **131,** not 132. **Bergroth, E.**—The first heteropteron from Juan Fernandez. **28,** xlii, 41-5. **Hempel, A.**—Tres novos coccideos. **136,** v, 143-46. **Horvath, G.**—Genera duo nova Scutelleridarum. **109,** xviii, 145-6. **Hussey, R. F.**—Ecological notes on Cymatia americana (Corixidae). **19,** xvi, 131-36. **Jacobi, A.**—Kritische bemerkungen uber die Cercopidae. **111,** 1921, A, 12, 1-65. **Parshley, H. M.**—New England Hemiptera-Heteroptera. II. **4,** liii, 233-39. **Poppius und Bergroth**—Beitrage zur kenntnis der myrmecoiden heteropteren. (So. Amer.) **109,** xviii, 31-88. **d. l. Torre Bueno, J. R.**—Food plant of Cymus discors. **19,** xvi, 136. **Weiss, H. B.**—A summary of the food habits of N. Am. Hemiptera. **19,** xvi, 116-18. **Weise, J.**—Einige neue Promecosoma arten. **111,** 1921, A, 12, 313-15.

Drake, C. J.—On some North and South American Tingidae. **39,** v, 37-43, 48-50.

LEPIDOPTERA. Bell, E. L.—Notes on parasites of Epargyreus tityrus. **19,** xvi, 129. **Busck & Heinrich**—Life history of Ethmia macelhosiella. **10,** xxiv, 1-9. **Dyar, H. G.**—New American moths and notes. A note on Bellura gortynoides. **15,** x, 8-18; 50. **Griffiths, G. C.**—The pupal habit of Telea polyphemus. **9,** lv, 38-9. **Rebel, H.**—Eine neue Nymphalide aus Brasilien. **137,** v, 67-8.

Cassino & Swett—Some new species of the genus Pero. Some new Geometrids. **16,** iii, 135-44; 144-50. **Watson, F. E.**—Miscellaneous notes and records of local L. and descriptions of two new aberrations. **6,** xxix, 168-73.

DIPTERA. Blacklock, B.—Notes on an apparatus for the individual breeding of mosquitoes. **98.** xv, 473-77. **Bonne-Wenster & Bonne**—A new coloration key for the species of the genus Goeldia. **15,** x, 37-8. **da Costa Lima, A.**—Sobre os Streblideos americanos (Pupipara). **136,** v, 17-34. **Enderlein, G.**—Uber die phyletisch alteren Stratiomyiiden-subfamilien (Xylophaginae, Chiromyzinae, Solvinae, Beridinae und Coenomyiinae.) (Mitteil. Zool. Mus. Berlin, x, 153-214.) **Evans, A. M.**—Notes on Culicidae collected in Venezuela. **98,** xv, 445-54. **Levy, L.**—Contributions a l'etude des metamorphoses aquatiques des dipteres. **134,** ix, 201-28. **MacGregor, M. E.**—The structural differences in the ova of Anopheles maculipennis, A. bifurcatus and A. plumbeus. **98,** xv, 417-26. **Malloch, J. R.**—Exotic Muscaridae. V. **11,** ix, 271-80.

Curran, C. H.—A new western Syrphid. A genus and species of Syrphidae new to Canada. **4,** liii, 258-60; 260. **Dyar, H. G.**—New

mosquitoes from Alaska. The American Aedes of the impiger (decticus) group. Note on the male genitalia of Culex coronator and allied forms. **15,** x, 1-3; 3-8; 18-19. **Felt, E. P.**—Mycodiplosis moznettei n. sp. **39,** v, 46. A study of gall midges. VII. **58,** No. 231, 81-240. **Garrett, C. B. D.**—New Tipulidae from British Columbia. **10,** xxiv, 58-64. **Parker, R. R.**—North Am. Sarcophagidae: A new genus and several n. sps. from the southwest U. S. **19,** xvi, 112-15.

COLEOPTERA. Boving & Champlain—The larva of the N. American beetle Zenodosus sanguineus of the family Cleridae. **10,** xxiv, 9-11. **Davis, W. T.**—Cicindela tranquebarica and its habits. Note on Cicindela tascosaensis. **19,** xvi, 111; 130. **Fleutiaux, E.**—Descriptions de deux generes nouveaux de Melasidae de la collection de Museum d'Histoire Nat. de Paris. **99,** 1921, 413-14. **Hopping, R.**—A review of the genus Monochamus. (Cerambycidae.) **4,** liii, 252-58. **Nicolay, A. S.**—Corrections and additions to the Leng list of Coleoptera. Family Buprestidae No. 1. **6,** xxix, 173-78. **Pic, M.**—Coleopteres nouveaux de la famille des Hylophilides. **99,** 1921, 415-18. **Schwarz & Barber**—The specific names of two Otiorhynchid weevils of Florida. **10,** xxiv, 29-30. **Van Zwaluwenburg, R. H.**—External anatomy of the Elaterid genus Melanotus, with remarks on the taxonomic value of certain characters. **10,** xxiv, 12-29. **Weiss & West**—Notes on the dodder gall weevil, Smicronyx sculpticollis. **82,** xxii, 63-5. **Wilke, S.**—Beitrage zur systematik und geographischen verbreitung ungeflugelter Tenebrioniden. (Asidinae.) **111,** 1921, A., 12, 248-312. **Woodruff, L. B.**—Lathridiidae in the heart of New York City. **6,** xxix, 178-79.

Dawson, R. W.—New species of Serica (Scarabaeidae). **6,** xxix, 160-68. **Fall, H. C.**—The North American species of Gyrinus. **2,** xlvii, 269-306. **Garnett, R. T. de**—Tableau des especes du genre Buprestis, appartnant a la faune de l'Amerique du Nord et description d'un variete nouvelle. **20,** 1922, 9-13. **Loomis, H. F.**—New species of the coleopterous genus Trox. (Jour. Wash. Ac. Sc., xii, 132-36.) **Notman, H.**—Some new genera and sps. of C. collected at Westfield, Chautauqua Co., N. Y. **6,** xxix, 145-60. **Wolcott, A. B.**—A new sp. of Saprinus from Kansas. **19,** xvi, 119-20.

HYMENOPTERA. Cushman, R. A.—The identity of a hymenopterous parasite of the alfalfa leaf weevil. **10,** xxiv, 64. **Forel, A.**—Quelques fourmis des environs de Quito (Ecuidor). (Bul. Soc. Vaudoise des Sci. Nat., liv, 131.) **Strand, E.**—Zur kenntnis neotropischer Joppinen. **137,** vi, 51-3 (cont.).

Cockerell, T. D. A.—The fossil saw-flies of Florissant, Colorado. **9,** 1922, 49-50. **Gahan, A. B.**—A list of phytophagous Chalcidoidea with descriptions of two n. sps. **10,** xxiv, 33-58. **Rohwer, S. A.**—North American sawflies of the subfamily Cladiinae, with notes on habits and descriptions of larvae. By W. Middleton. **50,** lx, Art. 1.

OBITUARY.

Dr. Thomas Algernon Chapman died at Reigate, Surrey, England, December 17, 1921. He was born at Glasgow, June 2, 1842. He was an M.D. of the University of his native town and was resident physician at institutions at Glasgow, Abergavenny and Hereford until his retirement in 1897. His father, Thomas Chapman (1816-1879), was active in entomology and father and son contributed joint papers to the English entomological magazines in the sixties of the last century. Dr. T. A. Chapman's work was largely on the life-history and genitalia of Lepidoptera, especially the Lycaenidae (1910-1915), *Erebia* (1898), Scoparidae (1911) and *Acronycta*, but he also wrote on the habits and transformations of Diptera (*Atherix* 1866), Coleoptera (*Hylesinus, Aphodius, Scolytus*), Hymenoptera (Oviposition of Sawflies, Chrysids parasitic on *Odynerus, Abdera* and *Bombylius*), etc.

He was a Fellow of the Entomological Society of London since 1891 and many times a Vice President, but could never be induced to accept the Presidency. He was elected a Fellow of the Zoological Society of London in 1897 and of the Royal Society in 1918.

His biographer (W. G. Sheldon) in *The Entomologist* for February, 1922, considers that

> Without doubt the late Dr. Chapman was one of the greatest and most scientific entomologists we have ever produced and one who in certain departments must be regarded as the greatest exponent Britain has given the science. . . . Foremost among his remarkable powers was his acuteness of observation; little facts that others would not have noticed were seized upon, their significance realized and important deductions made therefrom. His clear, logical mind and soundness of judgment were of the greatest importance and usually led him straight to the desired goal. . . . His entomological work was carried out in a thorough manner, and every detail carefully studied . . . it was always illustrated profusely with explanatory plates, many of them exquisitely drawn and colored. . . . He was one of the strongest exponents of the doctrine that we cannot satisfactorily classify species by one character alone, no matter whether it is by the ova, larva or pupa stage, or by the structure and markings of the imagine, but that we must take everything into consideration.

(There is also an obituary notice in *The Entomologists' Monthly Magazine* for February, 1922, by Mr. G. C. Champion, accompanied by a portrait.)

The Entomologists' Monthly Magazine for January, 1922, announces that *Entomologische Blaetter*, XIII, 1917, contains an obituary notice of Dr. Georg von Seidlitz, known for his writings on Palaearctic Coleoptera. He was born June 19, 1840, in Tschornaja Rjetschka, near Petrograd, and died July 15, 1917, at Irschenhausen, Oberbayern.

The same magazine for July, 1921, contains appreciative notices of Dr. George Blundell Longstaff, author of *Butterfly Hunting in Many Lands*, who died May 7, 1921, in his 73rd year, and who was a substantial benefactor of the Hope Department of Zoology (Entomology) at the University of Oxford.

Other entomologists whose deaths have occurred within the past twelve months but have not been noted previously in the News are Frederick William Lambert Sladen and the Reverend Thomas W. Fyles, obituaries of whom have appeared in the recently issued numbers of *The Canadian Entomologist* for October and November, 1921, respectively. Both men were immigrants to Canada, Mr. Sladen in 1912, Dr. Fyles in 1861. The former was on the staff of the Dominion Department of Agriculture, Division of Entomology, and was perhaps best known for his book, *The Humble Bee, Its Life-History and How to Domesticate it* (London, Macmillan, 1912); he was drowned off Duck Island in Lake Ontario, September 10, 1921.

Dr. Fyles was born at "The Hermitage," Enfield Chase, England, June 1, 1832, and died at Ottawa, August 9, 1921. He was rector and Immigration Chaplain in the Province of Quebec, 1864-1909. His collections were transferred to the Museum in the Quebec Parliament buildings in the latter year. He was the author of 76 papers in the *Reports* of the Entomological Society of Ontario and in other journals (*Canadian Entomologist* from 1882 on), dealing with various groups of insects.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Tropical Butterflies will be given in exchange for Terias nicippe, Vanessa antiopa, Euchloe sara or any aberrant forms of Lepidoptera. Hal Newcomb, 804 Elizabeth St., Pasadena, Calif.

I will collect material in any order, region Isthmus of Tehuantepec and C. A. Correspondence from persons needing material invited. J. J. White, Ocotlan de Morelos, Oaxaca, Mexico.

Wanted.—Diabrotica longicornis Say. from all parts of its range; also any N. A. species of this genus new to my collection. Liberal exchange. K. F, Chamberlain, Cornwall Bridge, Connecticut.

Wanted.—Elateridae from the Southern and Western States; Adelocera, Melanotus, and Cardiophorus especially desired. Liberal exchange in other Coleoptera, or for cash. Edward D. Quirsfeld, Hillsdale, New Jersey.

Halticini wanted in exchange for Coleoptera or insects of other orders.—L. G. Gentner, 213 Bailey St., East Lansing, Mich.

For Exchange—A large number of the living pupae of European Sphingidae for the living pupae of American butterflies and moths. I. C. Cheesman, Curator of Insects, Zoological Society of London, Regents Park, London, N. W., England.

Wanted—Species of Homoptera, Hemiptera and Orthoptera not represented in my collection in exchange for duplicate material of these orders from South Dakota. List of duplicates on application. H. C. Severin, South Dakota State College, Brookings, South Dakota.

Buprestidae, Cleridae, and **Carabinae** wanted from U. S. or Buprestidae of the world. Will collect insects of any group (except Lepidoptera) in exchange or pay cash. Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

For Exchange—A large number of live cocoons of Callosamia promethea, C. cynthia and P. cecropia for other pupae or Lepidoptera. D. C. Heim, Sunbury, Pa.

Wanted to Exchange—N. A. Coleoptera for same not in my collection. Carl Selinger, 4419 Dover St., Chicago, Ill.

Wanted for Cash or Exchange—Catocala eggs, also brilliant colored butterflies and moths for trays. Mrs. Robert Milde, Lewiston, Minn.

Syrphidae from all parts of North America wanted. Monographing the family.—C. H. Curran, Department of Entomology, University of Kansas, Lawrence, Kansas.

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RECENT LITERATURE

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COLEOPTERA

815.—**Fall** (H. C.).—The North American species of Gyrinus. (Trans., **47**, 269-306, 1 pl., 1922)..... .80

DIPTERA

818.—**Cresson** (E. T., Jr.)—Studies in American Ephydridae III. A revision of the species of Gymnopa and allied genera constituting the sub-family Gymnopinae. (Trans., **47**, 325-343, 1 pl., 1922)..... .45

ORTHOPTERA

817.—**Hebard** (M).—The janeirensis group of the genus Euborellia, with the description of a new species. (Dermaptera). (Trans., **47**, 319-324, 2 pls., 1922).... .20

816.—**Rehn** (J. A. G.).—Studies in Costa Rican Dermaptera and Orthoptera. I. Two new genera and three new species of Dermaptera. (Trans., **47**, 307-313, 1 pl., 1922) .20

The American Entomological Society has placed in operation a system by which entomologists who are not situated near the larger reference libraries, or who desire to build up special entomological libraries of their own and yet do not care to subscribe to the annual volume of the Society's "Transactions," may secure copies of the papers appearing in the Society's publications promptly after their receipt from the press.

If you are interested and desire to avail yourself of this system, advise us of the order or orders in which you wish to secure publications, together with a remittance of $1.00 or more as a deposit, and all papers on such orders will be mailed to you directly on their receipt from the printer. These will be charged against your amount of deposit at 25 per cent. discount from the list or general sale price. Any balance to your credit is returnable on demand should you not care to continue the subscription.

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